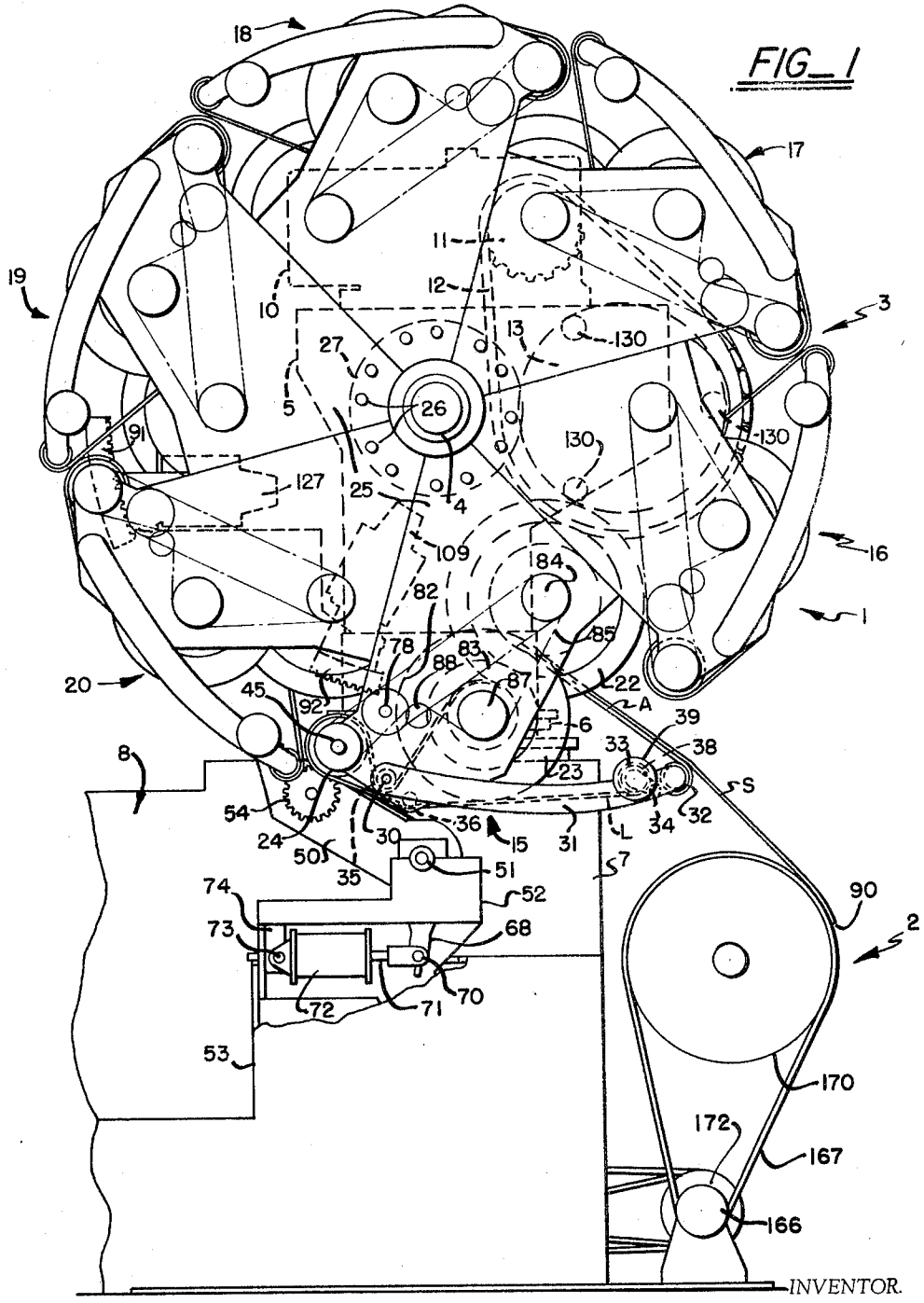
Oct. 11, 1966 A. CANTARUTTI 3,278,360

TIRE FABRIC HANDLING AND STORAGE APPARATUS

Filed Nov. 14, 1963 4 Sheets-Sheet 1

FIG_1



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TIRE FABRIC HANDLING AND STORAGE APPARATUS

Filed Nov. 14, 1963 4 Sheets-Sheet 2

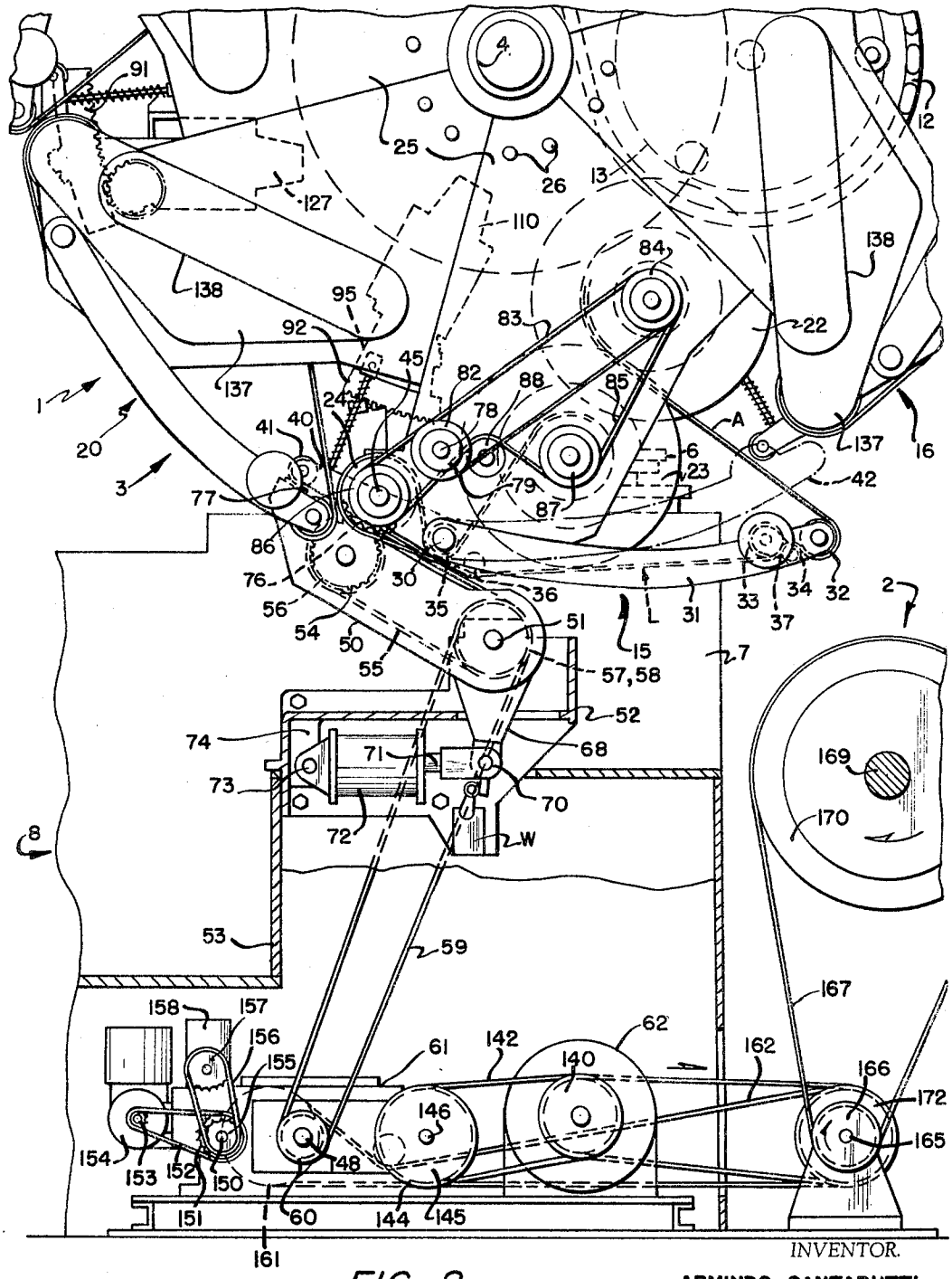


FIG_2

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TIRE FABRIC HANDLING AND STORAGE APPARATUS

Filed Nov. 14, 1963 4 Sheets-Sheet 3

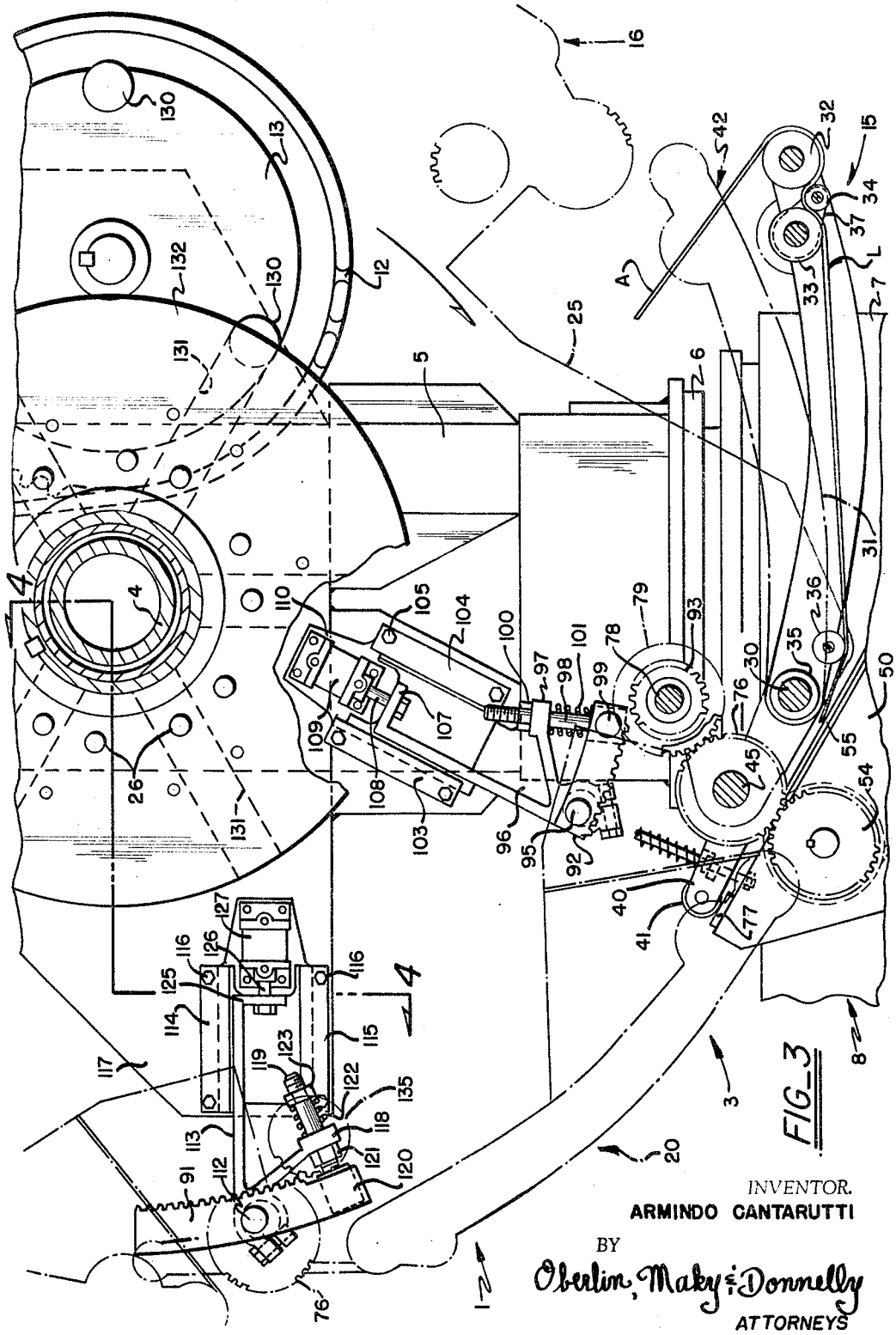


FIG_3

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TIRE FABRIC HANDLING AND STORAGE APPARATUS

Filed Nov. 14, 1963 4 Sheets-Sheet 4

FIG_5

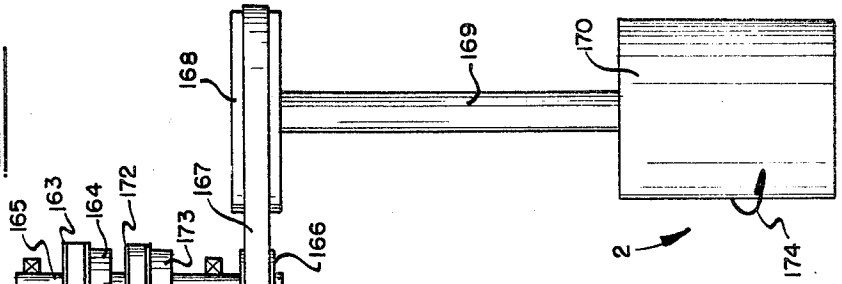
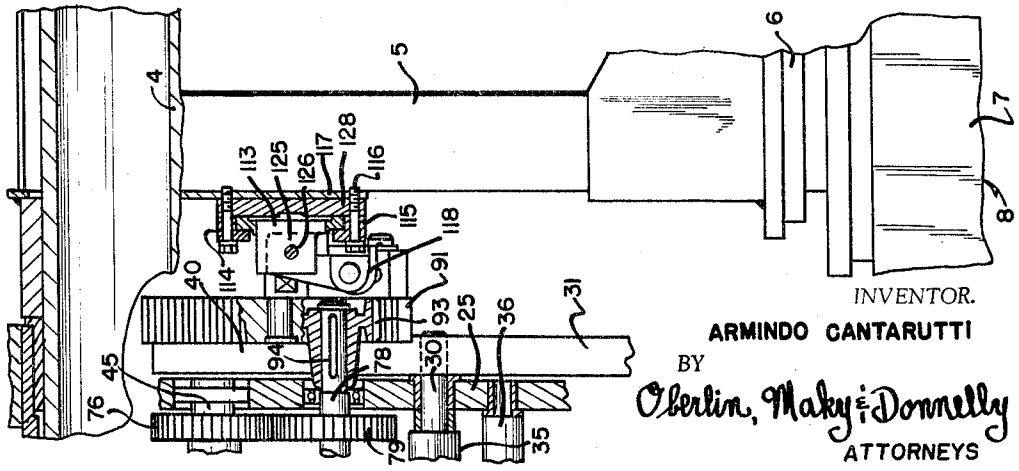


FIG_4



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United States Patent Office 3,278,360 Patented Oct. 11, 1966

3,278,360
TIRE FABRIC HANDLING AND STORAGE APPARATUS

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Filed Nov. 14, 1963, Ser. No. 323,811
15 Claims. (Cl. 156—406)

This invention relates generally as indicated to tire fabric handling and storage apparatus and more particularly to certain improvements in tire servicers such as that disclosed in the copending application of Edwin E. Mallory and Armindo Cantarutti, Serial No. 162,762, filed December 27, 1961, entitled "Tire Building Apparatus," now Patent No. 3,230,132.

In such copending application there is disclosed a four station tire servicer for a drum type tire building machine which will quickly and conveniently present for dispensation various types of tire building materials to the drum of a tire building machine. Tire fabric materials which form the plies of a pneumatic tire are relatively flimsy and quite tacky and accordingly extremely difficult to handle. When stored on drums, a contiguous layer of a liner material is required to be wrapped therewith and the nature of the material makes it extremely difficult for the operator to wrap such material about the drum at the proper zero tension and yet without any wrinkles or distortions.

The plies of tire fabric material which form the plies of the tire carcass generally have reinforcing cords therein biased in opposite directions. Accordingly, for each ply a different material must be employed and be readily available to the operator of the machine for quick and convenient correct application to the drum. Since tire carcasses of from two to six plies, for example, can readily be produced on the same machine, it is desirable to have a servicer for such machine which will accommodate the maximum number of different type building materials required therein.

It is accordingly a principal object of the present invention to provide a compact tire servicer which can store and dispense a larger number of different tire materials.

Another principal object is the provision of an improved and simplified synchronizing drive between the drum type tire building machine and the selected material dispensing unit of the servicer.

Another object is the provision of a simplified apron mechanism which will facilitate the convenient placement of the material for application to the drum.

Still another object is the provision of a more compact and simplified storage and dispensing unit within the servicer wherein the liner roll is positioned inside the triangle formed by the apron forming arms and the stock roll.

A still further object is the provision of an improved optional wind and rewind mechanism which is responsive to ferris wheel rotation.

Other objects and advantages of the present invention will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail a certain illustrative embodiment of the invention, this being indicative, however, of but one of the various ways in which the principle of the invention may be employed.

In said annexed drawings:

FIG. 1 is a schematic side elevation of a servicer in accordance with the present invention as seen from the drum type tire building machine side thereof;

FIG. 2 is an enlarged fragmentary side elevation partially broken away and in section illustrating more clearly the synchronizing drive between the servicer and the drum type tire building machine;

FIG. 3 is a further enlarged fragmentary side elevation partially broken away and in section illustrating the selectively employable wind and rewind mechanisms which are responsive to ferris wheel rotation;

FIG. 4 is a fragmentary vertical section taken substantially on the line 4—4 of FIG. 3; and

FIG. 5 is a somewhat schematic top plan view of the synchronizing drive between the servicer and the drum type tire building machine.

Referring now to the annexed drawings and more particularly to FIG. 1, there is illustrated a tire servicer 1 and a juxtaposed operatively associated drum type building machine 2. The servicer 1 comprises two ferris wheel units 3 mounted on a horizontally extending tubular shaft 4 extending through a frame 5 situated between the ferris wheel units 3 and mounted for rotation about a vertical axis on turntable 6 of pedestal 7. A drive mechanism (not shown) in housing 8 may be employed to rotate the ferris wheel about the vertically extending axis of the turntable 6 to present either to the drum type tire building machine 2 which is to one side of the pedestal 7. A drive unit 10 mounted on the top of frame 5 between the ferris wheels 3 drives sprockets 11 and through chains 12 a Geneva drive mechanism 13 for each of the ferris wheels 3 to index the same about their aligned axes or the horizontal axis of the tubular support shaft 4.

Each ferris wheel 3, in the illustrated embodiment, includes six tire material storage and dispensing units indicated at 15, 16, 17, 18, 19 and 20 which may be identical in form and accordingly only the unit 15 will be described in detail. Each unit, with particular reference to the unit 15, may comprise a stock roll 22, a liner roll 23, and a liner drive roll 24 journalled between laterally spaced segmental plates or side frames 25 secured at 26 by suitable fasteners shown to hub plates 27. The segmental shaped laterally spaced mounting plates 25 complement each other and thus complete the full circle of the ferris wheel 3 when the six illustrated storage and dispensing units 15 through 20 are provided.

A shaft 30 also extends transversely between the plates 25 to which are keyed a pair of arms 31 for pivotal movement therewith. A roll 32 is journalled between the distal ends of such arms. A roll 33 of approximately the same size as the roll 32 is also journalled between the arms near the outer end thereof and a smaller roll 34 is nested between the rolls 32 and 33 to confine the liner L to a sinusoidal path passing thereabout. The liner L which is threaded upon the liner roll 23 passes from the top thereof about a guide roll 35 journalled between the plates 25 and then from beneath such roll about the major circumference of rubber covered liner drive roll 24 and then beneath guide roll 36 journalled between the plates 25 beneath and fairly close to the pivot 30, through the sinusoidal path provided by the rolls 33, 34 and 32, and then upwardly in an inclined manner to be threaded on the stock roll 22 from the underside thereof. It is noted that the shaft of roller 34 is not journalled between arms 31 but between the distal ends of short arms 37 which are secured to the shaft of roll 33. A clockspring 38 in annular housing 39 is employed to bias the roller 34 in a counterclockwise direction as viewed in FIGS. 1–3 to maintain tension in the liner L. The liner L as it passes from the roller 32 at the distal ends of the arms 31 to the stock roll 22 forms an apron indicated at A to facilitate loading and dispensing of the tire building materials or stock S. In this manner, as the liner is wound from the liner roll 23 to the stock roll 22, tire fabric materials S placed upon the apron will be wrapped between the convolu-

tions of the liner on the stock roll **22**. In this manner, the stock will be separated by convolutions of the liner and will then not be wound upon itself. When the liner is driven to unwind from the stock roll **22** and wind on the liner roll **23**, the stock S will then be caused to move downwardly along the inclined apron A for dispensation to the drum type tire building machine **2** when the selected unit is in position.

Referring now additionally to FIGS. 2 and 3, the inner arm of each pair **31** is provided with a proximal extension **40** having on the end thereof a roller **41** adapted to be engaged as hereinafter described to extend the arms **31** from their phantom line position indicated at **42** to the full line apron forming position for loading and dispensing of the tire stock S. The arms **31** may then be pivoted about the axis of the shaft **30** to and from an extended apron forming position. The shaft **45** of the liner drive roll **24** is journalled between plates **25** and the roll **36** is also journalled between such plates.

The drive for the liner L to move the same in opposite directions for loading and dispensing of the stock will be imparted to the liner drive roll shaft **45**. On the machine side of the servicer, such drive may be imparted through a drive arm **50** pivoted at **51** to the top **52** of drive housing **53** for the drum type tire building machine **2**. As seen perhaps more clearly in FIG. 5, the distal end of the arm **50** is provided with a pinion **54** driven by timing belt **55** trained about sheaves **56** and **57** journalled at the distal and proximal ends, respectively, of the arm **50**. A sheave **58** is also journalled at the proximal end of the arm and a timing belt **59** is trained thereabout as well as about a drive sheave **60** on PIV unit **61** which is in turn driven by drive motor **62** for the drum type tire building machine **2**.

With special reference to FIG. 2, the arm **50** may be pivoted about its proximal pivot **51** by means of bell crank arm **68**. The bell crank arm constitutes an extension of arm **50** pivoted at **51** to the top **52** of the drive housing **53**. The distal end of the arm **68** is pivoted at **70** to rod **71** of piston-cylinder assembly **72**. The blind end of the piston-cylinder assembly is pivotally mounted at **73** to bracket **74** within the top housing **52**.

Accordingly, retraction of the piston-cylinder assembly **72** will pivot the arm **50** upwardly about its proximal pivot **51** until the pinion **54** on the distal end thereof is brought into engagement with pinion **76** on the liner roll shaft **45**. On the machine side of the servicer, the drive thus imparted to the liner drive roll shaft **45** will cause the same to rotate in a clockwise direction as viewed in FIG. 2, for example, pulling the liner and stock thereon from the stock roll **22** with the stock being dispensed upon the drum of the machine **2** and the liner wound on the liner roll **23**. It will, of course, be understood that a similar drive mechanism may be provided on the opposite side of the machine which will rotate the shaft **45** in the opposite direction to facilitate loading of stock up the inclined apron A into the stock roll **22**.

Retraction of the piston-cylinder assembly **72** and the pivoting of arm **50** also brings plate **77** on the distal end thereof into engagement with roller **41** pivoting the arms **31** downwardly into the apron forming position. A limit switch W is employed to signal the retraction of assembly **72** and the drive engagement as well as apron formation.

With special reference now to FIGS. 2, 3 and 4, to obtain this opposite movement of the liner from the drive imparted to the pinion **76** on the liner drive roll shaft **45**, there is provided a counter shaft **78** journalled between the plates **25** having thereon a pinion **79** in mesh with pinion **76** on liner roll drive shaft **45** (see FIG. 4). Thus the shafts **45** and **78** will always be rotated in opposite directions. The counter shaft **78** projects through the outer plate **25** and terminates in a cog belt pulley **82** which may be secured to the end of such counter shaft by means of a cam-roll overrunning clutch. A cog belt **83** is trained about the pulley **82** and also about a dual cog belt pulley **84** on the shaft of the stock roll **22**. A further cog belt **85** is trained about pulleys **86** and **87** on the drive and liner roll shafts respectively, about tension roll **88** and about the dual pulley **84** on the shaft of stock roll **22**. The cog belt pulley **86** may be mounted on the outer end of the liner drive roll shaft **45** by means of a cam-roll overrunning clutch in the same manner as the pulley **82** is mounted on the end of the counter shaft **78**. The drive roll **24** will have a diameter slightly smaller than the diameter of the liner and stock rolls **23** and **22**, respectively, so as to maintain tension in the liner between the drive roll and the liner and stock rolls depending upon the direction of rotation of the liner drive roll **24**.

When the liner L is being driven from the stock roll **22** to the liner roll **23**, the liner drive roll **24** will be driven in a clockwise direction as viewed in FIGS. 1 and 2, for example. In this direction, the clutch mounting cog belt pulley **86** will be engaged to drive the belt **85** also to drive the stock and liner rolls in such clockwise direction through pulleys **84** and **87**, respectively. Due to the slightly larger diameter of the liner roll, the liner L will be maintained in tension between the rolls **24** and **23**. Tension will be maintained in the liner L between the roll **24** and the stock roll **22** by providing a slip clutch in stock roll **22** so that as the stock roll shaft is being driven in a counterclockwise direction by the belt **85**, the liner L will be causing the roll **22** to be turned in a counterclockwise direction with the clutch slipping. Reference may be had to the aforementioned copending application for a more detailed showing of such slip clutch mounting for both the stock and liner rolls.

When the selected unit of the ferris wheel of the servicer is in a loading position on the opposite side as that shown in FIG. 1, the liner may be driven by a mechanism similar to the arm **50** in a synchronized manner from a loading conveyor or the like. In this condition, the liner L will be driven from the liner roll **23** to the stock roll **22** to wind the stock S and the liner L on the roll **22**. In this loading condition, the liner drive roll **24** will be driven in a counterclockwise direction as viewed in FIGS. 1 and 2, for example, and through the gearing **79** and **76**, the pulley **82** will be driven in a clockwise direction similarly to drive a stock roll **22** through the belt **83** with the clutch for pulley **82** engaged and the clutch for pulley **86** on shaft **45** slipping. Tension in the liner between the liner roll and drive roll will be maintained by the slip clutch of the liner roll. Tension in the liner between the drive and stock roll forming the apron A will be maintained because of the slightly larger diameter of the stock roll as compared to the liner drive roll.

Accordingly, from an external drive such as provided by the arm **50**, the various units **15** through **20** may be driven in either direction to facilitate loading and unloading of stock depending upon which of the selected units is indexed by the Geneva drive mechanism **13** into the bottom or loading and unloading position. Such indexing movement will, of course, position the roller **40** for engagement by plate **77** to form the apron A as well as position the pinion **76** of each unit to be engaged by the drive pinion **54** of the arm unit **50**.

Referring now more particularly to FIGS. 1 and 3, when the ferris wheel unit **3** is indexed into a selected stock dispensing position by rotation of the Geneva drive **13** in a clockwise direction as viewed in such figures, it is desirable to have the stock S extending from the selected unit so that the leading edge thereof indicated at **90** in FIG. 1, which may be cut on a bias, can readily be applied to the surface of the drum machine **2**. Moreover, when the operator of the machine **2** is finished with the stock, he may sever the same at approximately the position indicated at **90** and when the ferris wheel then indexes to a further dispensing station, it is desirable to have the portion of the stock overhanging the edge of the

apron formed by the roll **32** retracted or withdrawn back into the supply roll **22** so that the stock will then clear the drum as well as the top **52** of the housing **53**. Of course, the operator may wish to skip one or more dispensing stations and accordingly pay-out and subsequent wind-up of the stock in these stations is not necessary or desirable.

In order to accomplish the pay-out and wind-up of the stock in the dispensing units in response to rotation of the ferris wheel **3**, there are provided pay-out and wind-up racks **91** and **92**, respectively, which are adapted to mesh with gear **93** of each unit, such gear unit being keyed to extension **94** of the countershaft **78**. The rack **92** is adapted to engage the top of the gear **93** as it moves therepast rotating such gear in a clockwise direction as viewed in FIG. 3 to cause the liner drive roll **24** to rotate in a counterclockwise direction to wind the liner from the liner roll **23** back into the stock roll **22** and thus to withdraw or pull inwardly the leading edge **90** of the stock S. Conversely, the rack **91** will mesh with the bottom of the gear **93** rotating such gear in a counterclockwise direction as viewed in FIG. 3 to rotate the drive roll **24** in a clockwise direction to pull the liner from the stock roll extending the stock into proper position for application to the drum after the unit has cleared the drum and supporting sub-structure. The rack **91** is also positioned to engage the gear **93** of each dispensing unit before the ferris wheel has been accelerated to top indexing speed by the Geneva drive **13** for most effective pay-out of the stock.

The rack **92** is pivotally mounted on pin **95** extending from bracket **96** which is provided with an arm terminating in hub **97** accommodating therethrough an adjusting rod **98** which is connected to pin **99** pivoted to the opposite end of the rack **92**. A nut **100** is threaded on the upper end of such rod and a compression spring **101** surrounds such rod between the rack and the hub **97**. The compression spring **101** then maintains the rack **92** resiliently in engagement with the gear **93** as the dispensing unit **15** is indexed therepast and such gear comes into mesh with the rack.

The bracket **96** is mounted for sliding movement in gibs **103** and **104** which are secured by suitable fasteners **105** to the central frame **5**. The bracket **96** terminates in an L-shape portion or flange **107** which has secured thereto rod **108** of piston-cylinder assembly **109**, the latter being secured to support plate **110** in turn secured to the frame structure **5**. It can now be seen that by retracting the piston-cylinder assembly **109**, even through a relatively short distance, the bracket **96** will be slid along the gibs **103** and **104** and the rack segment **92** will be withdrawn from a path of engagement with the gear **93**. Accordingly, the operator may optionally withdraw the rack to prevent such rack and gear engagement.

Similarly, the segment gear **91** is pivoted on pin **112** to bracket **113** having lateral flanges secured beneath gibs **114** and **115** secured by suitable fasteners **116** to extension **117** of the frame **5**.

The bracket **113**, like the bracket **96**, also includes a laterally projecting portion terminating in a hub **118** through which extends a rod **119**, such rod being secured at **120** to the end of segment rack **91**. A nut **121** threaded on such rod is adapted to abut the hub **118** to limit movement of the rod therethrough. A compression spring **122** surrounds the rod between the hub **118** and nut **123** threaded on the projecting end thereof. Thus the compression spring **122** tends to bias the segment rack **91** in a counterclockwise direction about its center pivot **112** as viewed in FIG. 3. This will then tend to bring the leading edge of the rack resiliently into engagement with the gear **93** as the unit moves into position wherein the gear will mesh with such rack.

The bracket **113** inwardly terminates in an L-shape portion **125** secured to rod **126** of piston-cylinder assembly **127** which is in turn secured to the mounting plate **128**. Accordingly, by extension of the piston-cylinder assembly **127**, even through a relatively short stroke, the segment rack **91** may be moved out of a position in which it will engage the gear **93** of the dispensing unit as it is indexed therepast. Thus the operator, by retracting and extending the piston-cylinder assemblies **109** and **127**, respectively, may position the racks controlled thereby to clear the gear **93** so that a liner will not be driven thereby to wind-up or pay-out the stock. It will, of course, be understood that other suitable drive mechanisms may be employed optionally to wind-up or pay-out the liner as desired in response to rotation of the ferris wheels and the proper positioning of the selected dispensing units.

The drive of the liner in response to rotation of the ferris wheel to wind-up and pay-out the stock is then imparted from the Geneva drive mechanism **13** which comprises a wheel having three equally spaced rollers **130** projecting from one face thereof which engage within radially extending slots **131** in the opposed face of plate **132** secured to the hub of the ferris wheel. Such slots **131** are six in number and equally circumferentially spaced so that rotation of the Geneva wheel **13** by the chain **12** through an arc of 120° will cause the roller **130** on the Geneva wheel **13** to enter one of the slots **131** and rotate the ferris wheel through an arc of 60°. It will be appreciated that such movement of the ferris wheel will cause the gear **93** to move from the full line position indicated in FIG. 3 to the phantom line position indicated at **135**. In this manner, the segmental racks **91** and **92** will mesh with such pinion at the beginning of such indexing movement when the movement of the ferris wheel is the slowest.

It can now be seen that the liner roll **23** is positioned within the triangle formed by the apron forming arms **31** and the stock roll **22** as the apex of the triangle. In this manner, a much more compact loading and dispensing unit is provided within the ferris wheel and the side-by-side belts **83** and **85** may readily be covered with protective housings **137** as seen in FIG. 2 having elongated lateral projections **138** accommodating the outside belt **83**.

On the tire building machine **2** side of the servicer, an improved synchro-differential system may be employed to synchronize the drive of the drum and the liner L so that the stock S may be fed from the liner to the drum at proper zero tension and without any buckling, distortion, etc. Referring now particularly to FIGS. 2 and 5, the drive motor **62**, which may be an industrial D.C. motor, is provided with drive sprockets **140** and **141** at each end thereof which may have the same number of teeth and pitch diameter with timing belts **142** and **143** trained thereabout, respectively. The belt **142** is also trained about sprocket **144** mounted on clutch coupling **145** on input shaft **146** of gear reduction unit **147** of PIV **61**. The gear reduction unit **147** has a shaft **148** projecting therefrom on which the sprocket **60** driving belt **59** and eventually the liner drive roll **24** is mounted. For example, the gear reduction unit **147** may reduce the r.p.m. of shaft **146** from 1200 to a speed for shaft **148** of 147.2 r.p.m. and rotate such shaft in the opposite direction.

The gear reduction unit **147** includes the constant speed input shaft of the PIV **61** which may be of conventional variety. Variable speed drives of the type illustrated transmit power through a drive chain of self-forming metal teeth that engage radial grooves in two pairs of cone-shape sprockets of variable effective diameters. Small movement of control shaft **150** is operative simultaneously to vary the effective diameters of the cone-shape sprockets providing substantially infinite, stepless speed adjustments between input and output shaft speeds. The control shaft **150** may be provided with a sprocket **151** driven by chain **152** from sprocket **153** of motor and brake unit **154**. A further sprocket **155** on the control shaft **150** drives chain **156** and sprocket **157** of a follower potentiometer **158** for precise maintenance and control of the synchro-differential system.

The PIV may also include a gear train which consists

of single reduction gearing from the constant speed input shaft from the reduction gear box **147** to a built in differential side gear as well as reduction gearing from the variable speed shaft to the differential side gears. The side gears may turn in the same direction, but the constant speed and the variable speed shafts may rotate in the same or opposite direction to the differential output shaft. In the illustrated application, the output shaft **160** of the PIV will thus rotate at a controlled variable speed in the same direction as the input shaft **146** of the unit **61**. A sprocket **161** is mounted on the output shaft **160** and a timing belt **162** is trained thereabout and about sprocket **163** connected by clutch coupling **164** to jack shaft **165**. The jack shaft **165** is provided with a sprocket **166** which drives a belt **167** trained about the tire drum flat pulley **168** mounted on the drum shaft **169** of the drum **170** of the tire building machine **2**. The belt **143** entrained about the sprocket **141** on the opposite end of the drive motor **62** may also be trained about sprocket **172** connected through clutch coupling **173** to jack shaft **165**. By controlling the energization of the clutches **164** and **173**, the drum **170** may be rotated in the direction of the arrow **174** either directly from the motor **62** or through the synchronizing drives of the PIV **61**.

It can now be seen that the PIV provides a simplified synchronizing drive which will rotate the drum **170** and the liner drive rolls **24** at the same controlled surface speed to drive the liner and thus the stock to be fed from the apron A to the drum at zero tension and without any distortion, buckling, or unevenness which might result in a faulty tire carcass.

It can now be seen that there is provided a compact tire servicer for tire building machines of the ferris wheel type which may include six storage and dispensing units within each ferris wheel. Each storage and dispensing unit includes a stock roll with a liner extending therefrom to the distal ends of the apron forming arms with the liner storage roll being situated within the included acute angle between the apron and the arms. Moreover, such liner storage roll is included within the triangle formed by the pivot for the arms, the stock roll, and the distal end of such arms. The liner drive roll is adjacent the pivot for the arms and such liner storage roll is of course, also within the triangle formed by the drive roll, stock roll and the distal ends of the arms. In this manner, a highly compact dispensing unit is provided enabling the operator to have readily available a wide variety of tire building materials. The operator may readily index the ferris wheel and optionally remove from effective engagement the liner wind-up and pay-out mechanisms which are responsive to ferris wheel rotation. Furthermore, a highly simplified synchronizing drive is provided between the drum **2** and the liner to ensure that the stock S will be properly dispensed onto the drum at zero tension without undue wrinkling or distortion.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I, therefore, particularly point out and distinctly claim as my invention:

1. A tire servicer including a circular frame, a storage and dispensing unit in said circular frame comprising peripherally disposed circumferentially extending arms, pivot means for said arms on said frame, a stock roll journalled in said frame, a liner extending from said stock roll to the distal end of said arms at an acute angle with respect thereto to form an apron between said stock roll and the distal end of said arms, and a liner storage roll journalled in said frame operative to store liner payed from said stock roll and situated in said frame within the triangle formed by said stock roll, said pivot means and the distal end of said arms.

2. A tire servicer comprising a circular frame including a plurality of storage and dispensing units for tire building materials circumferentially positioned about said circular frame, each unit comprising circumferentially extending apron forming arms, a stock roll journalled in said frame, a liner extending from said stock roll to one end of said arms to form said apron, said apron and arms forming an acute angle, a liner storage roll journalled in said frame between said stock roll and arms and included within such acute angle a liner drive roll journalled in said frame adjacent the proximal ends of said apron forming arms for each of said units, and drive means operative to rotate said liner drive roll and thus drive the liner of a selected one of each of said units, said liner storage roll being within the triangle formed by said liner drive roll, the distal ends of said arms and said stock roll.

3. A tire servicer as set forth in claim **2** including drive means for said circular frame comprising Geneva drive and driven wheels, and means responsive to the rotation of said Geneva drive wheel through an arc of 120° to rotate said Geneva driven wheel through an arc of 60°.

4. A tire servicer as set forth in claim **3** including means responsive to the rotation of said circular frame operative to rotate said liner drive roll at the slower initial speed of said circular frame caused by said Geneva drive.

5. A tire servicer as set forth in claim **4** wherein said last mentioned means comprise a segment rack, a pinion for each said units operatively associated with the liner drive roll thereof, whereby rotation of said circular frame will cause said pinion to engage said rack thus to drive said liner.

6. The tire servicer as set forth in claim **2** wherein said drive means comprises a pivotally mounted arm having a drive gear on the end thereof, a driven gear for each of said units, and means operative to pivot said arm to mesh said drive and driven gears thus operatively to drive the liner of a selected unit of the servicer.

7. The tire servicer as set forth in claim **6** including a drive motor, a variable speed drive driven by said drive motor, means operatively connecting said variable speed drive and said drive gear on said pivotally mounted arm, a tire building drum, and means operatively connecting said variable speed drive and said tire building drum to rotate said drum and drive the liner of the selected unit at a synchronized surface speed.

8. In combination, a tire servicer and an associated drum type tire building machine, a plurality of storage and dispensing units in said servicer, means operative to index said servicer to present a selected one of said units in loading position with respect to said drum type tire building machine, a drive motor for said drum type tire building machine, a variable speed drive driven thereby, and means operatively connecting said drum type tire building machine to said variable speed drive and the selected one of said units to said variable speed drive to drive the same in synchronism to dispense from said selected unit tire fabric material to said drum type tire building machine at substantially zero tension; an input gear reducer on said variable speed drive, means operative to drive the selected one of said units from said input gear reducer, and means operative to drive the drum of said tire building machine from the output of said variable speed drive.

9. The combination set forth in claim **8** wherein said servicer comprises a circular frame and each unit comprises circumferentially extending apron forming arms, a stock roll, a liner extending from said stock roll to one end of said arms to form said apron, said apron and arms forming an acute angle, and a liner storage roll between said stock roll and arms and included within such acute angle.

10. The combination set forth in claim **9** including means operative to index said circular frame to present a selected one of said units in position for dispensing tire building materials to said drum type tire building machine.

11. The combination set forth in claim **10** including

means operative to connect and disconnect said drive from said variable speed drive to the selected one of said units to facilitate indexing of said circular frame.

12. The combination set forth in claim 10 wherein said last mentioned means comprises a pivotally mounted drive arm having a drive gear on the end thereof operative drivingly to mesh with a driven gear on the selected unit when pivoted toward said unit.

13. A tire servicer comprising a circular frame including a plurality of storage and dispensing units for tire building materials circumferentially positioned about said circular frame, each unit comprising circumferentially extending apron forming arms, a stock roll journalled in said frame, a liner extending from said stock roll to one end of said arms to form said apron, said apron and arms forming an acute angle, a liner storage roll journalled in said frame between said stock roll and arms and included within such acute angle, a liner drive roll journalled in said frame for each of said units, drive means operative to rotate said liner drive roll and thus drive the liner of a selected one of each of said units, drive means for said circular frame comprising Geneva drive and driven wheels, means responsive to the rotation of said Geneva drive wheel through an arc of 120° to rotate said Geneva driven wheel through an arc of 60°, means responsive to the rotation of said circular frame operative to rotate said liner drive roll at the slower initial speed of said frame caused by said Geneva drive, said last mentioned means comprising a segment rack, a pinion for each of said units operatively associated with the liner drive roll thereof, whereby rotation of said circular frame will cause said pinion to engage said rack to drive said liner, and means mounting said rack selectively for movement into and out of a position wherein said rack will engage said pinion.

14. A tire servicer as set forth in claim 13 including two such segment racks arranged to engage the opposite side of the respective pinions of adjacent units as said servicer is indexed therepast at the slower initial speed of said circular frame caused by said Geneva drive.

15. In combination a tire servicer and an associated drum type tire building machine, a plurality of storage and dispensing units in said servicer, means operative to index said servicer to present a selected one of said units in loading position with respect to said drum type tire building machine, a drive motor for said drum type tire building machine, a variable speed drive driven thereby, means operatively connecting said drum type tire building machine to said variable speed drive and the selected one of said units to said variable speed drive to drive the same in synchronism to dispense from said selected unit tire fabric material to said drum type tire building machine at substantially zero tension, an input gear reducer on said variable speed drive, means operative to drive the selected one of said units from said input gear reducer, means operative to drive the drum of said tire building machine from the output of said variable speed drive, a control shaft for said variable speed drive, a motor and brake unit driving said control shaft, and a follower potentiometer driven from said control shaft.

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